Steven Lee Meisler

Curriculum Vitae

Steven is a cognitive developmental neuroscientist whose graduate work used multimodal neuroimaging (fMRI and DWI) and psychocognitive evaluations to study the neural bases of reading abilities, disabilities, and intervention in children. As a postdoctoral fellow at the University of Pennsylvania, he is using large datasets and cutting-edge techniques to investigate white matter developmental trajectories in infancy. He is broadly interested in better understanding the relationship between brain structure and function, how these associations arise in development, and how they are affected by neuropsychiatric conditions. Steven received his bachelor's and master's degrees in bioengineering from the University of Pennsylvania in 2017 and 2018, and his PhD from Harvard University in Speech and Hearing Bioscience and Technology in May 2024.

Education

2019–2024 **PhD in Speech and Hearing Bioscience and Technology**, *Harvard University, Division of Medical Sciences*, Cambridge, MA
Secondary Field in Mind, Brain & Behavior
Dissertation: "White Matter Structural Correlates of Reading Abilities, Disabilities, and Intervention" - Advisor: John Gabrieli, PhD

2017–2018 **MSE in Bioengineering**, *University of Pennsylvania*, Philadelphia, PA, *3.79/4*
Thesis: "Evaluating the Effect of Intracranial EEG Data Cleaning on Univariate and Multivariate Classifier Performance" - Advisor: Michael Kahana, PhD

2013–2017 **BSE in Bioengineering**, *University of Pennsylvania*, Philadelphia, PA, *3.70/4*
magna cum laude
Minors in Mathematics, Jazz Studies, and Engineering Entrepreneurship

Research Positions

2024– **Postdoctoral Fellow**, *Lifespan Informatics & Neuroimaging Center*, University of Pennsylvania (PI: Theodore Satterthwaite, MD), NIH T32 Trainee
- Investigating white matter micro- and macrostructural trajectories in infants and toddlers, and how they are impacted by environmental factors such as socioeconomic status.
- Gauging the generalizability of white matter growth curves derived from research-quality datasets to data acquired clinically.
- Contributing to neuroimaging preprocessing software development (QSIPrep, QSIRecon, XCP-D).

Summer 2024 **Research Scientist Intern**, *Turing Medical*, St. Louis, MO
- Developed and tested neuroimaging software solutions for clinical practice.

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2019–2024 **PhD Candidate**, *Gabrieli Lab*, MIT Brain and Cognitive Science (PI: John Gabrieli, PhD), NIH T32 Trainee and F31 Fellow
- o Used advanced diffusion-weighted imaging models to study white matter microstructural correlates of reading in large pediatric cohorts.
- o Studied longitudinal microstructural changes in white matter associated with response to reading intervention.
- o Examined contributions of right hemispheric activity to reading improvement after intervention among dyslexic children.

2018–2019 **Clinical Research Coordinator**, *Laboratory for NeuroImaging of Coma and Consciousness*, Massachusetts General Hospital (PI: Brian Edlow, MD)
- o Used machine learning to test if EEG and MRI biometrics in the ICU can predict recovery outcomes from traumatic brain injury.
- o Was responsible for screening patients, as well as submitting and maintaining regulatory documentation.

2017–2018 **Graduate Research Assistant**, *Computational Memory Lab*, University of Pennsylvania (PI: Michael Kahana, PhD)
- o Researched efficacy of various data preprocessing methods on classification of neural activity during memory tasks
- o Created a Python-based GUI that visualizes and annotates EEG signals for analysis in a multi-site DARPA-funded clinical study

* Denotes Equal Authorship

▬▬▬ Published Articles

1. **Meisler*, S. L.** Kubota*, E., Grotheer, M., Gabrieli, J. D., Grill-Spector, K., A practical guide for combining functional regions of interest and white matter bundles. *Frontiers in Neuroscience* **18,** 1385847 (2024).

2. Hur, K.-H., **Meisler, S. L.,** Yassin, W., Frederick, B. B., Kohut, S. J., Prefrontal-Limbic Circuitry is Associated with Reward Sensitivity in Nonhuman Primates. *Biological Psychiatry,* In Press (2024).

3. Wang, H.-T., **Meisler, S. L.,** Sharmarke, H., Clarke, N., Gensollen, N., Markiewicz, C. J., Paugam, F., Thirion, B., Bellec, P., Continuous evaluation of denoising strategies in resting-state fMRI connectivity using fMRIPrep and Nilearn. *PLOS Computational Biology* **20,** e1011942 (2024).

4. **Meisler, S. L.,** Gabrieli, J. D. E., Christodoulou, J. A., White matter microstructural plasticity associated with educational intervention in reading disability. *Imaging Neuroscience* **2,** 1–18. ISSN: 2837-6056 (2024).

5. Poldrack*, R. A., Markiewicz*, C. J., **others**, The past, present, and future of the Brain Imaging Data Structure (BIDS). *Imaging Neuroscience* **2,** 1–19. ISSN: 2837-6056 (2024).

6. Decker, A. L., **Meisler, S. L.,** Hubbard, N. A., Bauer, C. C. C., Leonard, J., Grotzinger, H., Giebler, M. A., Torres, Y. C., Imhof, A., Romeo, R., Gabrieli, J. D. E., Striatal and Behavioral Responses to Reward Vary by Socioeconomic Status in Adolescents. *Journal of Neuroscience* **44** (2024).

7. Marks, R. A., Pollack, C., **Meisler, S. L.,** D'Mello, A. M., Centanni, T. M., Romeo, R. R., Wade, K., Matejko, A. A., Ansari, D., Gabrieli, J. D. E., Christodoulou, J. A., Neurocognitive mechanisms of co-occurring math difficulties in dyslexia: Differences in executive function and visuospatial processing. *Developmental Science,* e13443 (2023).

8. Yu*, T., Cai*, L. Y., Torrisi, S., Vu, A. T., Morgan, V. L., Goodale, S. E., Ramadass, K., **Meisler, S. L.,** Lv, J., Warren, A. E., Englot, D. J., Cutting, L., Chang, C., Gore, J. C., Landman, B. A., Schilling, K. G., Distortion correction of functional MRI without reverse phase encoding scans or field maps. *Magnetic Resonance Imaging* **103,** 18–27 (2023).

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9. Zhao, C., Tapera, T. M., Bagautdinova, J., Bourque, J., Covitz, S., Gur, R. E., Gur, R. C., Larsen, B., Mehta, K., **Meisler, S. L.,** Murtha, K., Muschelli, J., Roalf, D. R., Sydnor, V. J., Valcarcel, A. M., Shinohara, R. T., Cieslak, M., Satterthwaite, T. D., ModelArray: An R package for statistical analysis of fixel-wise data. *NeuroImage* **271,** 120037 (2023).

10. D'Mello, A. M., Frosch, I. R., **Meisler, S. L.,** Grotzinger, H., Perrachione, T. K., Gabrieli, J. D., Diminished Repetition Suppression Reveals Selective and Systems-Level Face Processing Differences in ASD. *Journal of Neuroscience* **43,** 1952–1962 (2023).

11. **Meisler, S. L.,** Gabrieli, J. D., Fiber-specific structural properties relate to reading skills in children and adolescents. *eLife* **11** (eds Forstmann, B. U., Behrens, T. E. & Manning, K. Y.) e82088. ISSN: 2050-084X (2022).

12. Richie-Halford, A., Cieslak, M., Ai, L., Caffarra, S., Covitz, S., Franco, A. R., Karipidis, I. I., Kruper, J., Milham, M., Avelar-Pereira, B., **others**, An analysis-ready and quality controlled resource for pediatric brain white-matter research. *Scientific data* **9,** 1–27 (2022).

13. **Meisler, S. L.,** Gabrieli, J. D., A large-scale investigation of white matter microstructural associations with reading ability. *NeuroImage* **249,** 118909. ISSN: 1053-8119 (2022).

14. Edlow, B. L., Barra, M. E., Zhou, D. W., Foulkes, A. S., Snider, S. B., Threlkeld, Z. D., Chakravarty, S., Kirsch, J. E., Chan, S.-t., **Meisler, S. L.,** Bleck, T. P., Fins, J. J., Giacino, J. T., R. H. L., Solt, K., Brown, E. N., Bodien, Y. G., Personalized connectome mapping to guide targeted therapy and promote recovery of consciousness in the intensive care unit. *Neurocritical care* **33,** 364–375 (2020).

15. **Meisler, S. L.,** Kahana, M. J., Ezzyat, Y., Does data cleaning improve brain state classification? *Journal of neuroscience methods* **328,** 108421 (2019).

� Articles in Review / Revision

1. Sydnor, V. J., Bagautdinova, J., Larsen, B., Arcaro, M. J., Barch, D. M., Bassett, D. S., Alexander-Bloch, A. F., Cook, P. A., Covitz, S., Franco, A. R., **others**, A sensorimotor-association axis of thalamocortical connection development. *bioRxiv,* 2024–06 (2024).

▬ Invited Talks

1. **Meisler, S. L.,** Gabrieli, J. D., *Fiber-Specific Properties Relate to Reading Ability.* Penn Lifespan Informatics and Neuroimaging Center Lab Meeting. 2022.

2. D'Mello, A., Frosch, I. R., **Meisler, S. L.,** Grotzinger, H., Perrachione, T. K., Gabrieli, J. D., *Evidence for domain-specific neural adaptation reductions in autism spectrum disorder.* Society for Neuroscience. 2021.

3. **Meisler, S. L.,** Bodien, Y., Zhou, D., Edlow. B., *Comparing Brain Responses to Music and Language Stimuli to Classify Consciousness.* American Congress of Rehabilitation Medicine Conference. 2019.

▬ Poster Presentations

1. **Meisler, S. L.,** Gabrieli, J., *Gray Matter Morphometry is Related to Reading Abilities (but not Meaningfully).* Organization for Human Brain Mapping. 2024.

2. **Meisler, S. L.,** Gabrieli, J., Christodoulou, J., *White Matter Plasticity in Response to Educational Intervention in Reading Disability.* Flux Society Meeting. 2023.

3. **Meisler, S. L.,** Kubota, E., Grotheer, M., Gabrieli, J., Grill-Spector, K., *Multimodal MRI Software for Identifying Functional Sub-Components of White Matter Bundles.* Organization for Human Brain Mapping. 2023.

4. **Meisler, S. L.,** Gabrieli, J. D., *Fiber-Specific Properties Relate to Reading Ability.* Organization for Human Brain Mapping. 2022.

5. **Meisler, S. L.,** Gabrieli, J. D., *A Large-Scale Investigation of White Matter Microstructual Associations with Reading Ability.* Cognitive Neuroscience Society. 2022.

6. **Meisler, S. L.,** Ozernov-Palchik, O., Farah, R., Beach, S. D., Horowitz-Kraus, T., Gabrieli, J. D., *Musical Training is Associated with Better Reading and Differences in Resting State Functional Connectivity in Adults.* Cognitive Neuroscience Society. 2020.

7. **Meisler, S. L.,** Bodien, Y., Zhou, D., Edlow. B., *Comparing Brain Responses to Music and Language Stimuli to Classify Consciousness.* Society for Music Perception and Cognition. 2019.

8. **Meisler, S. L.,** Liu, Q., Horwitz, B., *Examining Neural Audiovisual Object Processing through Large-Scale Neural Modeling.* NIH Summer Poster Day. 2016.

9. Leitman, D. I., Edgar, C., Gamez, K., **Meisler, S. L.,** Berman, J., Roberts, T. P., *Amygdala Centrality To Dual Pathway Processing Of Affective Prosodic Communication Part 2: Structural Connectivity.* Society of Biological Psychiatry. 2016.

Funding

External

8/2024 – 8/2025	**Psychosis: A Convergent Neuroscience Perspective**, Funding Agency: NIH, NIMH (type: T32; MH019112), Role: Trainee (PI: Raquel E. Gur)
9/2023 – Present	**Neurocognitive Mechanisms of Positive Intervention Response in Reading Disability**, Funding Agency: NIH, NICHD (type: F31; HD111139), Role: PI
8/2019 – 8/2022	**Training in Speech and Hearing Sciences**, Funding Agency: NIH, NIDCD (type: T32; DC000038), Role: Trainee (PI: Gwenaelle S. Géléoc)

Honors & Awards

6/2024- 06/2025	**Reproducible Neuroimaging Fellow**, ReproNim-International Neuroinformatics Coordinating Facility (INCF)
5/2024	**Ragnar & Margaret Naess Award** for exceptional musical talent and commitment to performance, MIT
8/2022	**Patrick J. McGovern Student Travel Award**, MIT
Summer 2022	**Selected for Neurohackademy 2022**
3/2022	**Certificate of Distinction in Teaching**, Harvard University
3/2020	**Mind Brain Behavior Graduate Student Award**, Harvard University
3/2019	**University Fellowship** *(declined)*, The Ohio State University
2017	***magna cum laude***, University of Pennsylvania
2015 – 2017	**Dean's List**, University of Pennsylvania

Skills

1 - Basic Knowledge; 5 - Expert

	Level	Skill	Comments
Computing:	■■■■□	Python	*Comfortable with data analysis, Jupyter, and Python-based software development*

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	■■■■□	MATLAB	*Can use MATLAB if required, but I prefer Python and terminal tools*
	■■■□□	Bash / Terminal	*Proficient in scripting and parallelizing jobs with HPC schedulers*
	■■□□□	R	*It's a work in progress...*
	■■■□□	LaTeX	*Prefer to write papers using either Overleaf or Google Docs (+Zotero)*
Methods	■■■■□	DWI	*Familiar with basic tensor and advanced diffusion modeling approaches*
	■■■□□	fMRI	*Familiar with several univariate and multivariate analytical approaches*
	■■□□□	EEG Time Series Analysis	*Master's thesis heavily employed ML-based analysis of continuous time-frequency decomposition*

Other Skills

Study Coordination	EPIC, REDCap, IRB	**Open Science**	GitHub, BIDS-apps

Verified Peer Reviews

- **Journal of Neuroscience, Biological Psychiatry, NeuroImage, Brain Structure & Function, npj Science of Learning, Brain Research Bulletin, Frontiers in Neuroscience**

Professional & Service Affiliations

09/2024	Promoted to Moderator, NeuroStars support forum (`Nuerostars.org`)
2021–Present	Member, Organization for Human Brain Mapping
2019–Present	Volunteer, Virtual Bedside Concerts, Mass General Brigham
2019–Present	Member, Cognitive Neuroscience Society
2019–2021	Co-Chair, American Congress of Rehabilitation Medicine, Arts & Neuroscience Cognition Task-Force

Teaching Experience

Teaching Fellow, Harvard University

Falls 2021-2023	**How Music Works: Engineering the Acoustical World**

How does Shazam know what song is playing? Why do some rooms have better acoustics than others? How and why do singers harmonize? Do high-end musical instruments sound better than cheap ones? How do electronic synthesizers work? What processes are common in designing a device and composing a piece of music? How is music stored and manipulated in a digital form? This class explores these and related themes in an accessible way for all concentrators, regardless of technical background. The class is driven by hands-on projects to enhance your technical literacy, a critical skill for anyone designing solutions to today's most pressing and complex issues. The projects are designed so that the creativity of students in all fields will have a role to play. Lectures, demonstrations, and guest lecturers/performers are integrated into the class to build foundational knowledge and to inspire. We will also explore wider social and historical themes related to music and acoustics. The class is approached

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from an engineering perspective, using music and musical instruments as the framework to introduce a broad array of concepts in physics, mathematics, and engineering. Requires no previous exposure to physics or calculus beyond the high school level.

2020 Undergraduate Mentoring Certification, Faculty of Arts & Science, Division of Science

Teaching Assistant, University of Pennsylvania

Fall 2017 **Differential Equations & Linear Algebra**

This course is about linear algebra and systems of differential equations. The linear algebra part of the course begins with matrices and solving linear equations and then has to do with vector spaces in general and linear transformations between them. The topics in differential equations include higher order single variable equations and systems of linear ordinary differential equations. The goal is to enable everyone taking the course to use these tools accurately, efficiently and flexibly. The engineering section of math 240 will emphasize current applications of the theory to communication, optimization, and modeling the behavior of complicated systems.

Fall 2016 **Bioengineering Signals & Systems**
& 2017

Properties of signals and systems; Examples of biological and biomedical signal and systems; Signal operations, continuous and discrete signals; Linear, time invariant systems; Time domain analysis; Systems characterized by linear constant-coefficient differential equations; Fourier analysis with applications to biomedical signals and systems; Introduction to filtering; Sampling and the sampling theorem. Examples vary from year to year, but usually include signals such as the ECG and blood pressure wave, principles of signal coding in the auditory system and cochlear implants, and simple applications in biomedical imaging.

Software

FSuB-Extractor

(Python/Bash) `https://github.com/smeisler/fsub_extractor`

This is a flexible open-source software toolbox for finding components of white matter bundles that connect to functional regions of interest. Studying these **F**unctional **Su**b-**B**undles (FSuBs) could lead to more precise studies relating brain structure, function, and behavior.

DEJI Experience

2024 University of Rhode Island Diversity and Inclusion Badge Program

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